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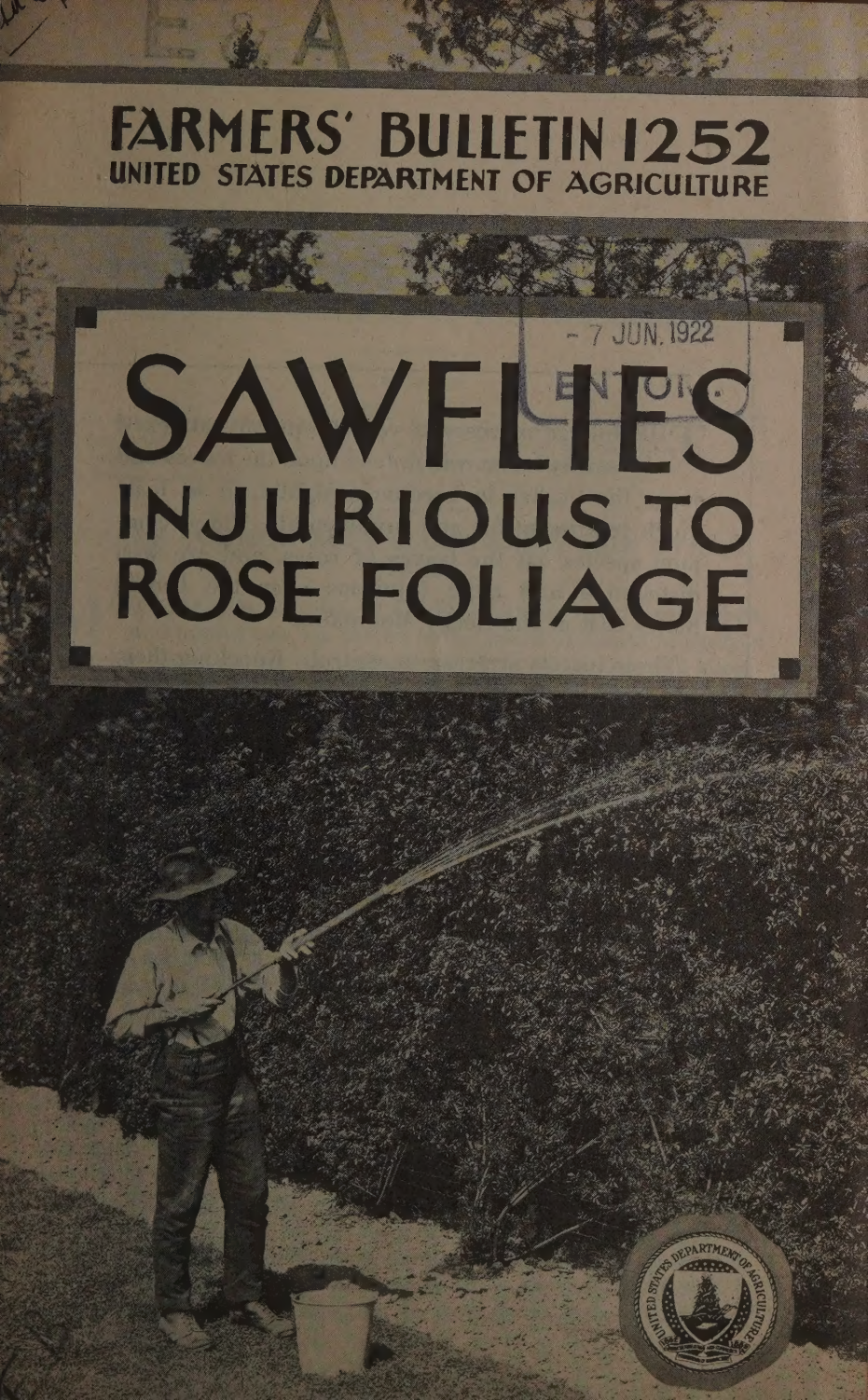
SAWFLIES INJURIOUS TO ROSE FOLIAGE



THE foliage of roses is very frequently attacked by sawfly larvæ, which feed upon the leaves and cause the bushes to become unsightly, or at least much less beautiful and ornamental. Three common species eat the leaves of roses, and are well distributed and quite injurious over the United States east of the Rocky Mountains.

These insects are easy to control. Knocking them some distance from the bush with a stream of water is a simple remedy. Since they eat the leaf tissue, thoroughly spraying the leaves with a stomach poison, such as 3 rounded teaspoonfuls of powdered arsenate of lead to 1 gallon of water, whenever the larvæ begin to appear, will kill them and thus prevent the injury.

Contribution from the Bureau of Entomology
L. O. HOWARD, Chief
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SAWFLIES INJURIOUS TO ROSE FOLIAGE.

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THREE COMMON ROSE SLUGS AND THEIR OTHER FORMS.

MOST varieties of roses, especially climbers, hybrid perpetuals, and hybrid teas, are subject to the attack of insects which feed upon the leaves, giving the bush an unsightly appearance and lessening its vitality.

The commonest of these pests belong to the group of insects which in the adult form are termed "sawflies," or in the immature stages are often spoken of as "false caterpillars." The adults have received the name "sawflies" because the egg-laying apparatus of the female more or less resembles a saw and is used to cut slits or pockets in the plant tissue in which the eggs are placed. The larvæ are spoken of as "false caterpillars" because, although they resemble caterpillars, they produce adults radically different from moths.

The rose sawflies, in common with all insects of the group, have four phases which differ in appearance and it is during only one of these that the species is injurious. The first phase is the egg; the second is the feeding, growing stage, the larva, which is wormlike or caterpillarlike; the third phase is the resting, nonfeeding stage during which the wormlike creature in a case or chamber changes gradually to a form resembling the adult but lacking free-moving wings and legs; from this helpless pupa the adult emerges and freeing itself from the confining cell is ready to perform its part in the life cycle by laying eggs and perpetuating the species.

The adult stage of the rose sawflies offers no opportunity for control and because it is seldom associated with the damage done by the larva is not discussed in this bulletin. The other stages, however, offer satisfactory means of identifying these insects, and since it is during these immature stages that the damage is done or that control

measures may be applied successfully the following descriptions and illustrations point out the differences in the pests.

There are three common or injurious species of rose sawflies in the United States. They are the bristly rose slug,[1] a native species closely resembling a European species with which it has been long confused; the European rose slug,[2] a species present in both Europe and North America; and the coiled roseworm,[3] a species chiefly remarkable for its habit of boring into the ends of pruned shoots to pass its resting stage, and named for the curled or coiled position it assumes when feeding upon the leaves.

THE BRISTLY ROSE SLUG.

The bristly rose slug is by far the most frequently encountered rose defoliator, and a rosebush is seldom seen which does not show some traces of its work. It occurs in the States east of the Mississippi River and north of a line drawn from St. Louis, Mo., to Richmond, Va. Often all but the newest leaves are covered with work of the various stages of this species, the bush presenting a much-abused and sickly appearance.

The eggs are laid in slits cut in the midrib of the leaf from the upper side. These slits are about one-sixteenth of an inch long and usually appear as small yellowish spots against the green midrib. The yellow color is due to the presence of sawdust, or drying plant tissue, torn out by the saw.

The larva, as its common name suggests, is sluglike, greenish white, and clothed with long, rather stout hairs. Upon hatching from the egg the young larva begins its attack upon the leaves, usually from the underside and, eating all but the thin upper skin of the leaflet, furnishes as evidence of its presence skeletonized spots readily recognized by their white translucency. As the slug increases in size, its work changes from skeletonizing to hole-eating and finally to eating the entire leaflet, without regard for any but the largest veins. When full grown, the larva constructs an irregularly shaped cocoon of varying thickness from a brownish to whitish transparent membrane. During the spring and summer this cocoon is placed without regard to other than temporary shelter on leaves, at the angles of twigs, and in such places, but the overwintering insects choose a place that is rather more protected, as in the ground.

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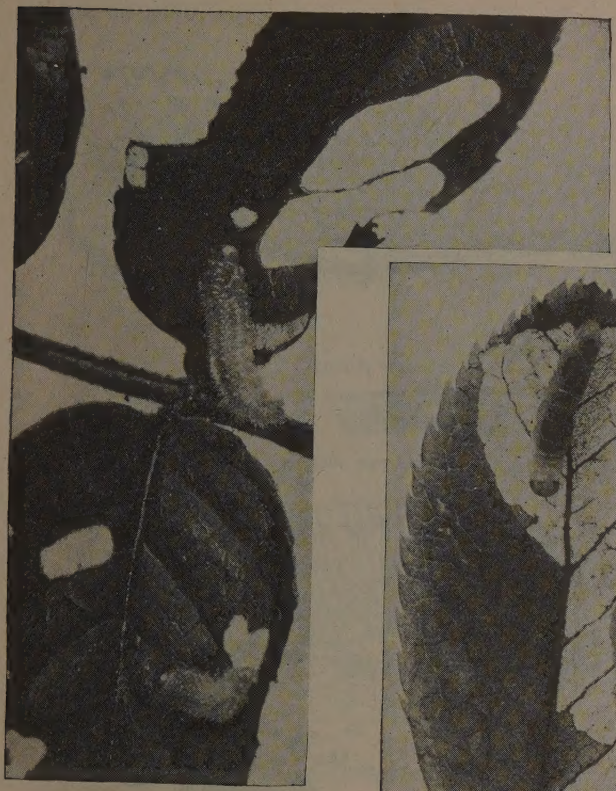
[1] *Cladius isomerus* Norton; order Hymenoptera, suborder Chalastogastra, superfamily Tenthredinoidea, family Tenthredinidae, subfamily Cladiinae.

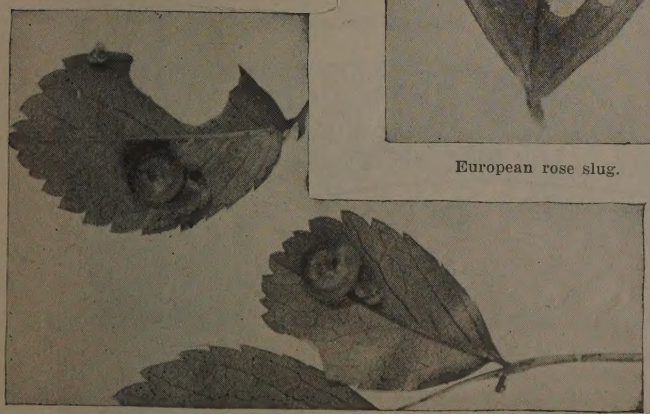
[2] *Caliroa aethiops* Fab.; order Hymenoptera, suborder Chalastogastra, superfamily Tenthredinoidea, family Tenthredinidae, subfamily Messinae.

[3] *Emphytus cinctipes* Norton; order Hymenoptera, suborder Chalastogastra, superfamily Tenthredinoidea, family Tenthredinidae, subfamily Allantinae.



Bristly rose slug.

European rose slug.

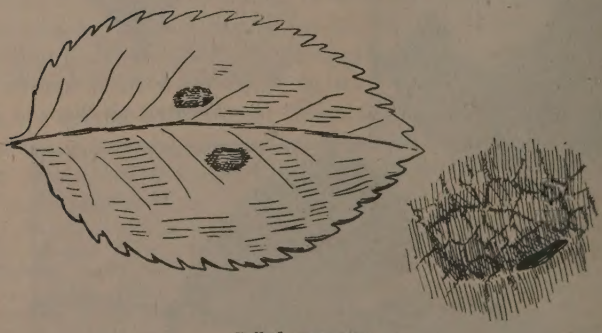


Coiled roseworm.

FIG. 1.—Our three injurious rose slugs. All more or less enlarged.

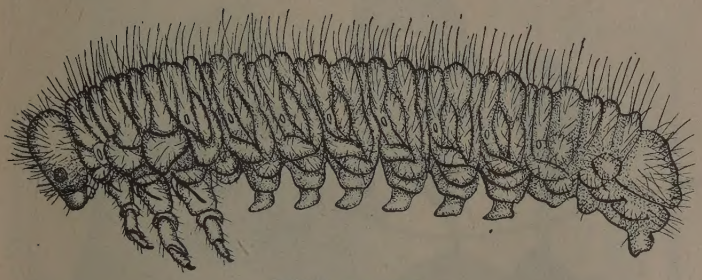
Bristly rose slug.

European rose slug.

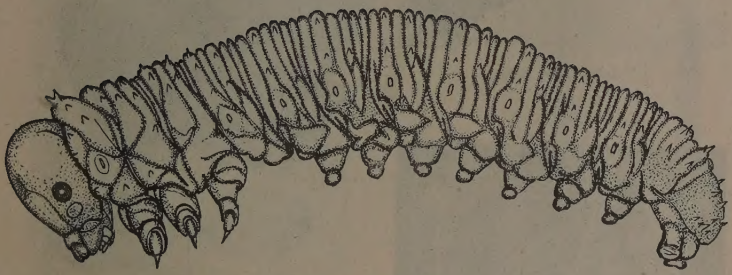


Coiled roseworm.

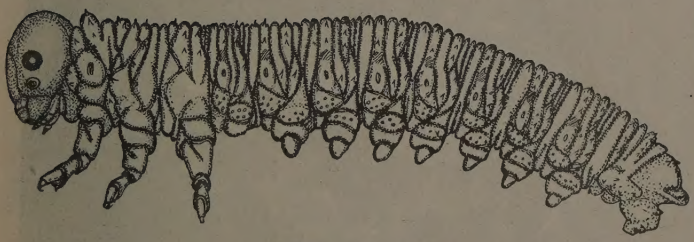
FIG. 2.—Eggs of the three rose slugs and where they are placed.



Bristly rose slug.



European rose slug.

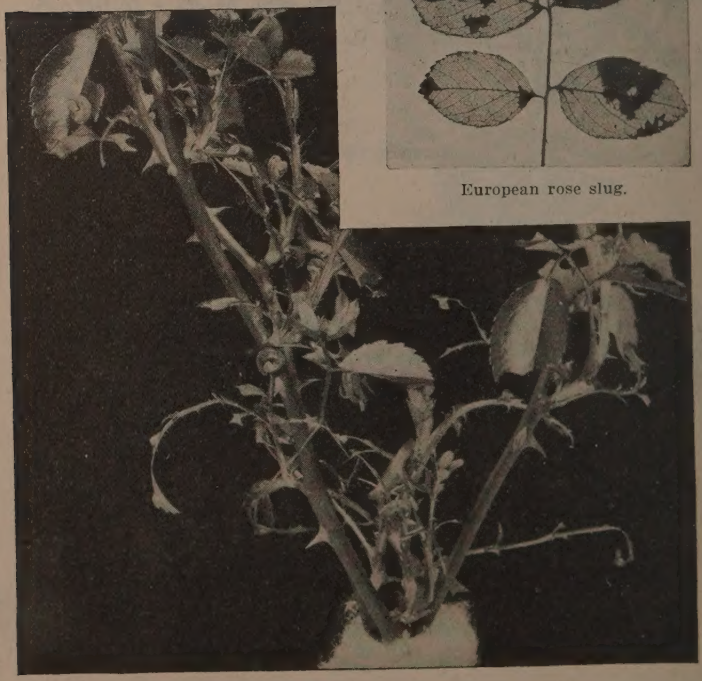


Coiled roseworm.

FIG. 3.—Our three injurious rose slugs and how they differ. Greatly enlarged.

Bristly rose slug.

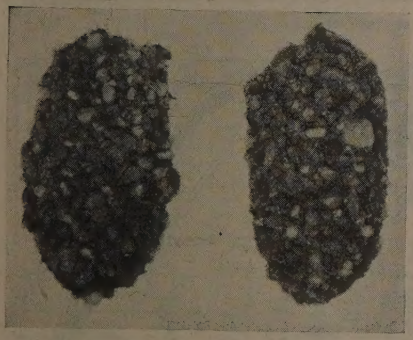
European rose slug.



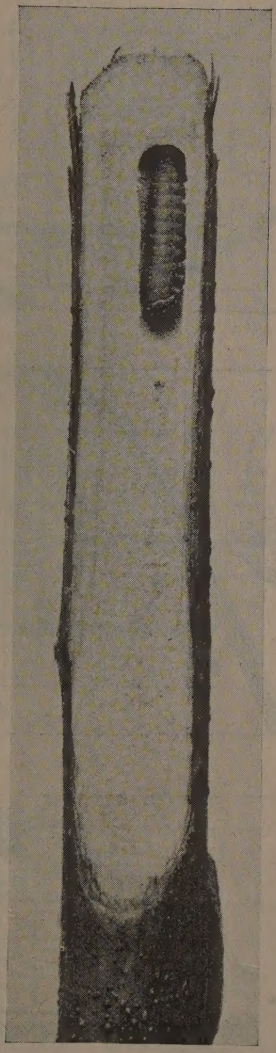
Coiled roseworm.

FIG. 4.—Work of the three rose slugs contrasted.

Bristly rose slug.

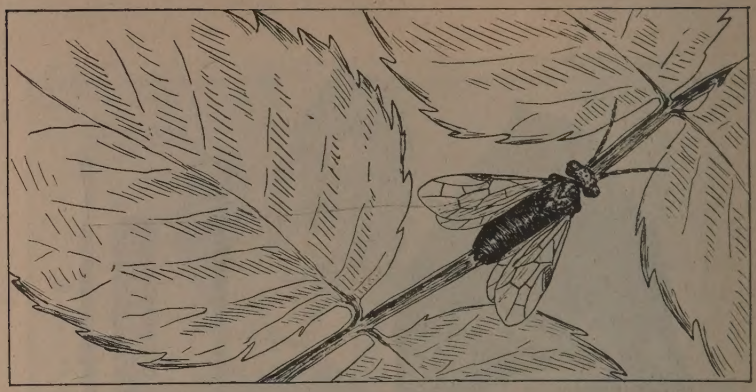


European rose slug.

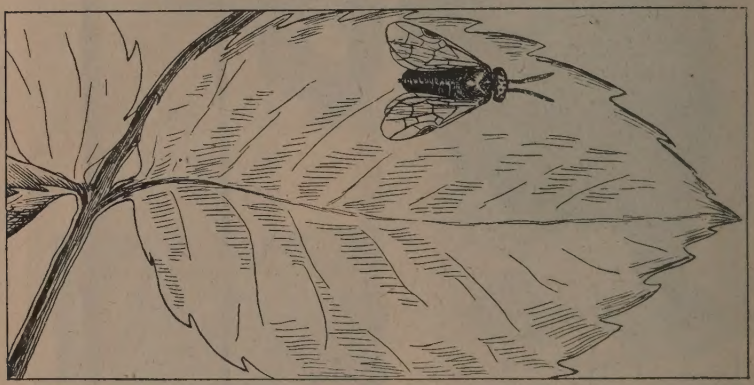


Coiled roseworm.

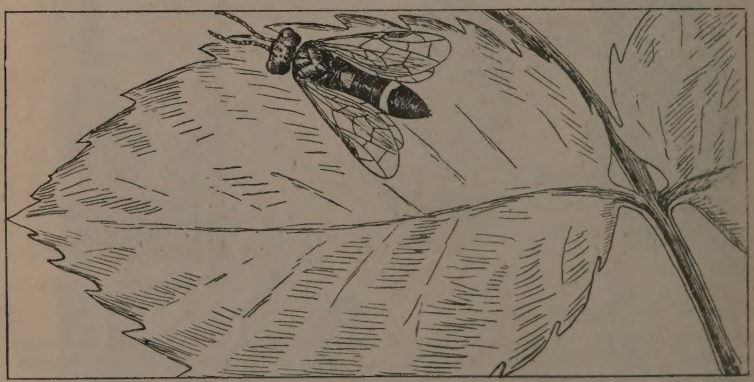
FIG. 5.—Where the three rose slugs change to adult sawflies: Bristly rose slug, in cocoons on leaves or rubbish; European rose slug, in cocoons in the ground; coiled roseworm, in cells hollowed out in dead twigs or brashy wood.



Bristly rose slug.

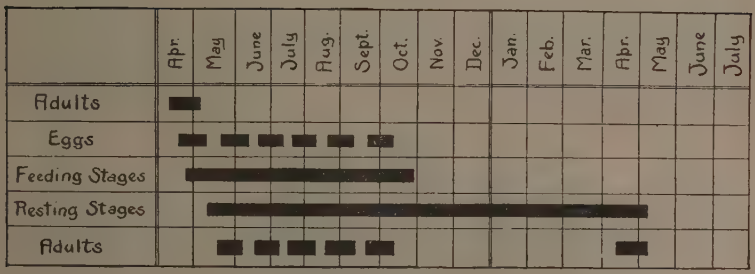


European rose slug.

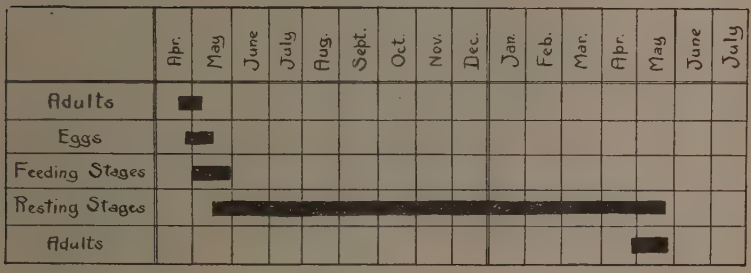


Coiled roseworm.

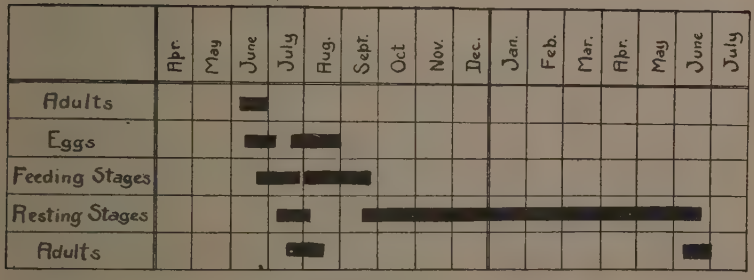
FIG. 6.—The adults, or sawflies, which develop from the three kinds of rose slugs. Much enlarged.



Bristly rose slug.



European rose slug.



Coiled roseworm.

FIG. 7.—Diagrams showing life and seasonal histories of the three rose sawflies.

The entire life cycle from egg to adult occupies approximately 30 days. In the vicinity of Washington, D. C., there are six of these 30-day life cycles or generations each season. There is such a great overlapping of these generations, due to the irregularity of emergence of the overwintering adults and the variation in individual development, that shortly after the first brood all stages may be present at the same time.

THE EUROPEAN ROSE SLUG.

The European rose slug is probably the next most common rose sawfly and is reported as injurious in States as far west as the Rocky Mountains. The eggs of this species are laid in pockets in the leaf tissue quite near the edge of the leaflet, with the slit at the base of one of the leaflet's serrations and with the egg prominent on the underside of the leaflet and protected and held in place there by the thin under membrane of the leaf. The larva is yellowish green in color with food causing the alimentary tract to appear dark olive green. It feeds upon the upper surface of the leaf by a characteristic chafing method, eating only the soft tissue and leaving the veins and under tissues showing yellowish on the green leaflet. When full grown the larva leaves the bush and enters the ground where it constructs a cell, cementing together particles of sand and earth to form a capsule-shaped chamber. It is within this cavity that the quiescent period is spent. This stage occupies most of the year, carrying the species through the summer, fall, and winter until the following spring. Thus the life cycle is approximately a year in length and the species has only one generation a year.

THE COILED ROSEWORM.

The coiled roseworm is not especially abundant in any section of the country, but occasionally occurs in sufficient numbers to attract attention, either because it bores into the pruned ends of shoots or because it feeds on the leaves. It is the former habit that causes it to be most frequently the object of inquiry. This species occurs from Minnesota to Maine and as far south as northern Virginia.

Its eggs are laid in the upper surface of the leaflet and not especially near the edge, as in the preceding species. The larva which hatches begins feeding by skeletonizing patches from the underside of the leaflet, leaving only the thin upper skin which appears whitish transparent. This method of feeding does not last long, as the larva soon begins devouring all of the leaf tissue, first eating holes through and then feeding on the entire leaflet, exclusive of the largest veins. When full grown this larva searches for a piece of soft wood or similar material, and when the pruned ends of rose shoots are avail-

able it will bore into the pith of these and construct a gallery and cell for its resting stage.

In the southern range of the species there are two generations, one having a short life cycle of several days more than a month and the other occupying the remainder of the year.

HOW TO CONTROL ROSE SLUGS AND PROTECT THE FOLIAGE.

The control of these pests is easy. So simple a thing as a strong stream of water applied often and from different angles is a remedy in that it knocks the larvæ from the leaves and they perish before they are able to return. In places where a strong stream of water is either unavailable or inconvenient to use, a stomach poison like lead arsenate and water sprayed upon the leaves gives good results. If the spraying is to be extensive and a large quantity of the mixture is to be used, 1 pound of powdered lead arsenate to 50 gallons of water is the proper proportion and a large compressed-air hand sprayer or barrel pump will be found suitable. If the spraying is to be limited to several bushes 3 rounded teaspoonfuls of powdered lead arsenate to a gallon of water is a good mixture and one of the small hand spray pumps will serve the purpose.

Another spray which will be effective against young larvæ and which has the additional advantage of being a good aphid remedy is 40 per cent nicotine sulphate which should be diluted as recommended upon the container, usually 1 part to 800 parts of water in which some fish-oil or laundry soap has been dissolved. For small quantities use approximately 1 teaspoonful of the nicotine sulphate to 1 gallon of water in which 1 ounce of soap has been dissolved.

The life cycles and the number of generations have been discussed in this paper in order that those whose plants are infested may be able to determine for themselves whether it will be necessary to spray once or a number of times during the year.

Since the European rose slug spends most of the year in cells or resting chambers in the ground, thorough working of the soil will help to reduce its numbers, by breaking up the cells and exposing the soft, weak, unprotected pupæ to the weather and various predatory enemies.

The coiled roseworm may also be combated by painting the ends of pruned twigs, removing all pithy stems and brashy wood, and leaving no suitable hibernating place available.

The bristly rose slug can be destroyed in large numbers by burning the old leaves and other litter in which they have spun cocoons. Hence clean cultural methods are to be strongly recommended as a means of insect control in the growing of roses.

It will further simplify the task of a grower if he will endeavor to interest his neighbors who have roses to cooperate with him in destroying pests, for if bushes belonging to them remain infested they will be a constant source of reinfestation for his.

A STUDY of this bulletin should make it possible to identify the particular kind of sawfly attacking roses. This done, information on the number of generations to be expected may be had by consulting the life-cycle diagrams (fig. 7). If only one generation occurs, as in the European rose slug, one or two sprayings should effect control; but if there is more than one generation, as with the coiled rose-worm and the bristly rose slug, the gardener will have to keep a closer watch upon his bushes and spray more often.

Farmers' Bulletin 750, which deals with roses and their culture, contains a discussion of the remedies for various insect pests. This bulletin is of value to all rose growers and may be obtained from the Division of Publications, United States Department of Agriculture, Washington, D. C.

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